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AUTHOR Simpson, William A.; Sperber, William E.
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ABSTRACT

Three models to describe university salary structure were assessed. Attention was focused on full-time, permanent faculty in ranks of instructor through full professor. Model I postulated that the internal labor market is uninfluenced by the external academic market. The results of model I were compared to the results of a model that adjusted for the market value of academic disciplines. It was found that the market value of academic disciplines have a considerable effect on the regression residuals. The judgment as to which departments are underpaid is almost completely dependent upon whether the market factors are or are not considered. Statistical measures indicated that the model incorporating external market effects (model III) has less auto-correlation of the salary residuals and is therefore the preferred model. A further comparison of two models, utilizing slightly different sets of market factors (Model II and Model III), showed that the salary residuals are extremely sensitive to data changes. (SW)

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THE EFFECTS OF ACADEMIC MARKET VALUE ON THE OUTLIERS OF A MULTI-VARIANT REGRESSION ANALYSIS OF FACULTY SALARIES

William A. Simpson, Associate Professor

William E. Sperber, Data Resources Administrator

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ABSTRACT

A decline in faculty mobility together with a diminishment of academic salary purchasing power and the continued pressure for affirmative action all conjoin to focus much attention on faculty salary studies. These intense pressures are pushing such studies towards greater statistical sophistication. In so doing, they open up a wider assortment of potential misinterpretation simultaneous with decreasing the number of critics capable of understanding the underlying assumptions and their shortcomings.

This paper uses three models to describe the same salary structure. The strikingly different outcomes of these models is then used to point up the importance of the implicit initial assumptions and the hidden dangers of ascribing too many virtues to processes about which one has a less than perfect understanding.

THE EFFECTS OF ACADEMIC MARKET VALUE ON THE OUTLIERS OF A MULTI-VARIANT REGRESSION ANALYSIS OF FACULTY SALARIES

As academic salaries decline in purchasing power and faculty mobility continues to diminish, we can expect to see more attention focused on university salary systems. This attentiveness will surface in the form of pressure being exerted by diverse groups to uncover and correct imbalances within an institution's salary structure. Already there have been many special studies centered on the detection of implicit salary injustices arising from institutional biases against women faculty members, (Gordon, Morton, Brandon, 1974; Johnson, Stafford, 1974, Reagan, Maynard, 1974, Tanur, Coser, 1978). This is but a taste of what the future may hold once various faculty affinity groups are lead to believe that their only hope for a sizable salary increase is through the process of claiming a perceived salary bias. It is easy to construct a formidable list of possible claims: women vs. men, 10 month appointees vs. 12 month appointees, tenure system faculty vs. temporary faculty, tenured faculty vs. untenured tenure-system faculty, liberal arts faculty vs. applied discipline faculty, permanent faculty without a Ph.D. (Master of Fine Arts in music, art, theatre, etc.) vs. Ph.D.-holding faculty, instructional faculty vs. research staff faculty,.... Along with this increased pressure to disclose and redress salary deviations, there is a growing sophistication among the faculty as to how a salary study should be conducted and interpreted. There has been a definite trend away from studies which simply compile and compare salary averages for various subgroups of faculty; more recent studies have used the techniques of multi-variant regression analysis. Some have even incorporated refinements with which, up to now, only professional economists were familiar. The escalation in statistical sophistication is due to the widespread

use of these methods in current research done in the various social sciences and education disciplines. These simultaneously occurring trends imply that administrators will have to have more than a passing impression of what a regression analysis is and, more importantly, they will have to have a solid, empirical grasp of what can and cannot be claimed as being statistically sound.

If current research in this area involved nothing more than the application of standard regression methods there would be few technical or subjective aspects to discuss. However, the task of uncovering salary discrimination invariably leads to an examination of regression residuals (actual salary minus predicted salary) in a search for outliers. Once the research takes this turn, there are many novel technical and subjective issues that require consideration. In fact, the difficult process of detecting regression outliers can be regarded as lying athwart the frontier of statistical research. The inherent difficulty is well expressed in the phrase 'Regressions eat outliers.'. The purpose of this paper is to bring out some aspects of salary studies, as they are currently being conducted, which are not only troubling but also not intuitively obvious. The implications should be useful to both sides of any salary debate and, at the very least, should serve to heighten the awareness of the many unresolved and complex issues with which one may have to deal in the course of conducting a comprehensive salary study.

I. THE PROBLEM

Within this paper, three models are discussed. They all originated with the faculty perception that there were large salary differentials existing among members of the same rank. While some of these could be attributed to differences in qualifications and experience, many of the faculty conjectured that the largest proportion of these differentials was patterned along disciplinary lines and

reflected an in-house salary bias against certain departments and whole disciplinary areas. Before this conjecture could grow into a heated anomaly claim, it was decided that an internal labor market analysis should be conducted to ascertain if certain departments are paid significantly low salaries and if this could be attributed to any factor except an irrational, university bias against those disciplines. Clearly, what was called for was a departmental salary comparison that adjusted for the differences in rank, qualifications, and experience of the constituent faculty members--namely, a multi-variant regression analysis. The final stage would consist of determining the department outliers of the regression.

This then was the problem as it was originally conceived. However, once the regression model (labelled as model I) was constructed and the results were absorbed, it was the consensus that such a purely internal labor model could not be convincingly supported as the most rational approach. A second model, model II, was then developed so as to recognize the effects of the external labor market. Although the two models appeared to be nearly equivalent according to the more common statistical measures, further tests on the residuals showed that the second model was statistically as well as conceptually an improvement over model I. At this point, some experimental runs indicated that the results of even the second model may be extremely sensitive to the data used. To confirm this, a different, but equally valid, set of external market factors for the various disciplines was used to obtain a third regression model, model III, which resulted in outliers that were strikingly different from model II. Illustrating this problem of sensitivity became the second objective of this paper.

What follows is a more detailed exposition of these experiences with the three models.

II. PROCEDURE

The procedures follow the general pattern of such studies. First, it was decided that the appropriate faculty pool would be all tenure system faculty. This restricted attention to only full-time, permanent faculty in ranks of instructor through full professor. From this population, all faculty who were essentially administrators were removed because it was felt that their identity within a discipline was largely negated by the effect their administrative role had on salary.

The selection of independent variables was determined by their availability and by previous regression runs made to determine their relative significance. For example, the source of an individual's terminal degree did not appear important enough to warrant the effort to include it as a variable. The unavailability of years of experience was surmounted by using age as a proxy. The usual practice of using the logarithm of the salary and including $(\text{age})^2$ and $(\text{years in rank})^2$ as variables to account for the non-linear downturn in salaries with time was observed.

III. RESULTS

A. Model I (a pure internal labor market model).

A step-wise regression was run using fifteen variables included on the faculty records tape. The results are displayed in Table 1 under the Model I label. The squared multiple correlation of .7668 was in the range expected from previous experience and the results of other published salary studies. At this point, attention was shifted away from the regression equation and turned towards a study of the residuals--the residuals being the difference between an individual's salary as predicted by the regression equation and his actual salary. The residuals represent that portion of a person's salary that cannot be attributed to the effect of the qualification variables used in the regression. The second stage of the

study consisted of using the regression equation to calculate the residuals for every faculty member; these residuals were then aggregated by department and the ratio of the departmental residual to the departmental predicted salary total was calculated. An ordering of the departments from highest positive ratio (presumably the most overpaid department) to the lowest negative ratio (most underpaid department) was then developed to display the structure of the residuals (see Table 2, Model I). At this point there was strong faculty pressure to establish a cut-off line, below which, departments were to be considered as belonging to an anomaly class with high priorities for group salary adjustments. Even if one sets aside the many statistical questions that spring to mind at such a suggestion, there remains the very subjective issue of where to draw the line, a question that was never resolved because the whole issue became secondary to a much more critical consideration--the issue of whether a model that ignores the economic pressures external to the university can be considered reasonable from either a pragmatic or a theoretical viewpoint.

Reviewers of the analysis reached the consensus that the underlying premise of model I--all faculty members of identical rank and qualifications should be paid at the same scale, irregardless of discipline--was fatally flawed. The premise did not recognize the effects of supply and demand felt even within the academic world; a major university remains 'major' only by the success of its efforts to attract and retain exceptionally talented people. Thus all universities are activitely vying in an open academic market where offers are matched by counteroffers. The cumulative effect is an implicit, but very real, 'market value' for every academic specialty. No amount of collegiality can overcome the fact that an associate professor of surgery will have to draw a far higher salary than an associate professor of classical languages. Thus, it was decided that a second model must be developed to take into account the external market value of each discipline.

B. Model II

Within every university, the average salaries for each rank vary considerably from department to department. The effects of a peer group academic market value are certainly confounded by the variance in faculty mix and qualifications. However, it may be reasoned that if one looks at the faculty in a given department for enough peer universities, the differences in faculty qualifications would quite likely nullify each other and leave as the net effect the one parameter that all departments of a specific discipline have in common--the market value of a terminal degree in that specialty. Fortunately, the 23 state-supported institutions belonging to the Association of American Universities exchange departmental salary data in a very standardized form. By calculating, for each rank, the average salary of each discipline and then normalizing these average salaries with respect to the median salary, one can derive an 'academic market value' for every department. (Departments within newly formed disciplines were deleted on the grounds that their faculty rank configuration and salaries would be atypical). For various considerations, it was decided to remove the effect of the market value from the salary structure before running the regression analysis rather than treating market value within the regression. It was somewhat surprising to find that although adjusting the salaries to account for market value greatly altered the salary scale, the resulting regression equation was not that much improved in significance ($r^2 = .8161$) or in form (see Table 1, Model II). (Similar results were obtained by Brashkamp and Johnson, even though they used a differently defined market value and worked with it as a regression variable.) At first appearances then, it seems that market value has little explanatory value and would therefore have but negligible effect on the conclusions drawn from the models; however, when completing the second phase of the study--the ranking of departments by residuals--it was found that a significant change had taken place. The entire rank ordering

of the departments had undergone a radical permutation (the Spearman Rank Correlation test on the rankings of the two models gives a $\rho = .19$); in particular, of the ten lowest ranking departments (supposedly underpaid by 5% or more) of the first model, only three appeared among the ten lowest ranking departments in Model II. It is also clear that the range of residuals for the second model is more restricted. Thus the perception of what departments appeared to be anomalies changed drastically from model to model. A later more detailed analysis of the residuals resulting from the two models using a change of sign test, the Durbin-Watson test, and Von Neumann ratio, revealed that the residuals of the second model, incorporating the market value, had considerably less auto-correlation within the departments; this would suggest that the first model was missing an important variable that had been captured in the second model, presumably 'market value'. Its importance must be judged not by its explanatory value but rather by the great effect it had on the salary residuals, the primary object of concern.

At this point there was considerable motivation to state the results and conclude the study. Nevertheless, there was nagging doubt as to whether the investigation had been pushed quite far enough. Some preliminary regression runs using different faculty pools (for example part-time and temporary faculty) indicated that the departmental salary residuals may be extremely sensitive to the data used. If this were the case, considering the central importance of the departmental market values, what might be the effect of using other indicators of market value? This question was addressed by the creation of yet another model.

C. Model III

A recent faculty salary study conducted by the National Association of State Universities and Land Grant Colleges (NASULGC) contained a data element labelled as 'salary factor'. This element was derived by calculating the ratio of the average salary for a given rank of a given academic discipline to the total

average salary for that rank across all disciplines and all 72 institutions included in the study. These ratios bear a very close resemblance to the AAU market values and could be regarded as a value which is more national in scope.

A third regression model was obtained by dividing each salary by the appropriate NASULGC factor and then using these standardized salaries in the regression. The results are shown in Table 1 under the Model 3 columns. Again, the new regression equation does not appear to be greatly different from the other models. The decrease in r^2 from Model 2 to Model 3 would indicate that perhaps the AAU market values might be more appropriate than the NASULGC values; this indication is given greater strength by a larger amount of auto-correlation in the residuals of the third model. However, the issue under consideration here is not so much a judgment as to which model is the best but rather to what extent were the residuals of Model 2 altered by the relatively minor change in data as represented by Model 3. The results are shown in Table 2. Again, the bottom roster of ten departments exhibiting the greatest amount of unexplained negative residual is quite different from the corresponding group of Model II. Only five of the ten departments are common to both models.

Even though the change in residuals from Model II to Model III is less abrupt than the change from Model I to Model II as measured by both the Spearman rank correlation coefficient ($\rho = .65$ vs. $\rho = .29$) and the congruence of the ten most underpaid departments (three out of ten vs. five out of ten), it nevertheless is significant to anyone faced with the task of justifying and implementing a sizeable increase in salaries for a large faculty subgroup.

IV. CONCLUSIONS

The study began by treating the university salary structure as an internal labor market completely uninfluenced by the external academic market. The results of this model (Model I), favored by a large faculty group, were compared

to the results of a model that adjusted for the market value of academic disciplines (Model II). The conclusions were:

(1) The market value of academic disciplines have a considerable effect on the regression residuals. The judgment as to which departments are 'underpaid' is almost completely dependent upon whether the market factors are or are not considered.

(2) Statistical measures indicate that the model incorporating external market effects (Model II) has less auto-correlation of the salary residuals and is therefore the preferred model.

A further comparison of two models, utilizing slightly different sets of market factors (Model II and Model III) showed that the salary residuals were extremely sensitive to data changes. This final observation has serious implications for those who wish to use such studies as a basis for implementing anomaly salary increases. Across the board increases for large groups of faculty can be expensive. Once one realizes that a slightly different set of input data could result in anomaly payments to a very much different group of faculty, such a policy has considerably less appeal.

We may expect that HEW audits of affirmative action progress will initiate many analyses of regression residuals. It is hoped that the caveats raised in this paper will induce other investigators to proceed carefully and avoid the expression of conclusions in a dogmatic style.

TABLE 1

Three Faculty Salary Regression Models

Variable	Mean Value	MODEL I regression coeff	MODEL I std error	MODEL II salaries adjusted for AAU market value regression coeff	MODEL II std error	MODEL III salaries adjusted for NASULGC market value regression coeff	MODEL III std error
Instructor	.0438	standard		standard		standard	
Assistant Professor	.2245	.0925	.0225	.1358	.0206	.1948	.0209
Associate Professor	.2814	.3238	.0264	.3342	.0245	.4169	.0254
Full Professor	.4733	.5573	.0266	.5557	.0251	.6516	.0240
Age	45.34	.0117	.0034	.0097	.0030	.0111	.0030
$(Age)^2$	2162.41	-.0001	.0000	-.0001	.0000	-.0001	.0000
Years in rank	6.54	.0214	.0019	.0198	.0016	.0235	.0016
$(Years\ in\ rank)^2$	75.71	-.0004	.0001	-.0005	.0001	-.0005	.0000
10 month employment	.6438	standard		standard		standard	
12 month employment	.3562	-.0228	.0067	-.0074	.0058	-.0256	.0061
Tenured	.7748	-.0707	.0157	-.0390	.0137	-.0923	.0127
Untenured	.2252	standard		standard		standard	
Ph.D.	.8760	not significant		not significant		not significant	
Master's degree	.1240	standard		standard		standard	
Constant		9.2487	.0797	9.2161	.0692	9.2390	.0695
Mean log salary		10.0284		9.9151		9.9644	
Standard deviation		.13663		.09945		.1128	
n		1443		1443		1143	
r^2 (unadjusted)		.7768		.8161		.7809	

TABLE 2

RANK ORDERING OF DEPARTMENTS BY SALARY RESIDUALS

	MODEL I				MODEL II (AAU Market value adjustments)				MODEL III (NASULGC Market value adjustments)			
	DEPARTMENT	Dept Avg Predicted Salary	Dept Avg Actual Salary	$\frac{\Sigma \text{ residual}}{\Sigma \text{ pred sal}} \times 100\%$	DEPARTMENT	Dept Avg Predicted Salary	Dept Avg Salary Adjusted for Market Value	$\frac{\Sigma \text{ residual}}{\Sigma \text{ pred sal}} \times 100\%$	DEPARTMENT	Dept. Avg Predicted Salary	Dept Avg Salary Adjusted for Market Value	$\frac{\Sigma \text{ residual}}{\Sigma \text{ pred sal}} \times 100\%$
1	Economics	$21,007	$24,640	17.2%	1 Aud. & Speech	$20,219	$22,078	9.2%	1 Economics	$27,067	$15,313	9.6
2	Marketing	22,932	26,148	14.0	2 Astromony	21,132	22,763	7.7	2 Chemistry	24,572	22,732	8.0
3	Accounting	19,851	22,406	12.9	3 Forestry	24,658	26,478	7.4	3 Audiology	25,765	23,903	7.8
4	Astronomy	20,423	22,763	11.5	4 Social Work	19,801	21,045	6.3	4 Forestry	27,966	26,062	7.3
5	Psychiatry	24,470	27,194	11.1	5 Horticulture	23,778	25,207	6.0	5 Advertising	18,300	17,061	7.3
6	Computer Science	19,612	21,699	10.6	6 Civ. & San. Engr.	21,036	22,253	5.8	6 Marketing	28,040	26,247	6.8
7	Management	21,776	23,804	9.3	7 Economics	23,718	24,898	5.0	7 Animal Husbandry	28,547	26,798	6.3
8	Chemistry	21,185	22,882	8.1	8 Animal Husbandry	24,123	25,298	4.9	8 Urban Planning	22,703	21,410	6.0
9	Civ. & San. Engr.	20,280	21,721	7.1	9 Anthropology	19,479	20,417	4.8	9 English	21,543	20,368	5.8
10	Urb. Plan & L.A.	20,221	21,583	6.7	10 Nursing	15,425	16,116	4.5	10 Parks & Recreation	24,008	22,742	5.6
11	Electrical Engr.	20,116	21,421	6.5	11 Marketing	25,049	26,148	4.4	11 Accounting	25,840	24,505	5.4
12	Social Work	19,501	20,689	6.0	12 Chemistry	21,922	22,882	4.4	12 Health, Physical Ed	21,906	20,835	5.1
13	Chemical Engr.	21,270	22,560	6.0	13 Humanities	18,598	19,403	4.3	13 Crop & Soil Science	28,222	26,914	4.9
14	Pathology	23,547	24,885	5.7	14 Advertising	18,324	19,104	4.3	14 Horticulture	26,106	24,957	4.6
15	Statistics	21,103	22,289	5.6	15 Communications	20,687	21,546	4.2	15 Agricultural Econ.	28,147	26,917	4.6
16	Advertising	17,098	18,034	5.5	16 Dairy Science	23,028	23,975	4.1	16 Nursing	16,535	15,841	4.4
17	Physics	22,137	23,315	5.3	17 H.P.E.R.	20,601	21,421	4.0	17 Agric. Engineering	28,507	27,368	4.2
18	Sociology	21,129	22,213	5.0	18 Hum. Env. & Des.	18,892	19,612	3.8	18 Communications	20,988	20,161	4.1
19	Labor, Ind. Rel.	20,249	21,204	4.8	19 Geography	20,412	21,137	3.6	19 Music	19,810	19,042	4.0
20	Geography	20,187	21,137	4.7	20 Crop & Soil Sci.	25,707	26,576	3.4	20 Entomology	24,508	23,647	3.6
21	Micro. & Pub Health	19,409	20,137	4.7	21 Physics	24,019	24,771	3.1	21 Resource Developmt.	27,453	26,489	3.6
22	M.M.M.	23,0[illegible]	24,131	4.6	22 Anatomy	24,054	24,602	2.3	22 Theatre	17,649	17,033	3.6
23	Parks & Recr.	16,809	17,554	4.4	23 Entomology	22,077	22,563	2.2	23 Art	20,760	20,048	3.5
24	Engr. Instr. Serv.	16,917	17,665	4.4	24 English	20,012	20,449	2.2	24 Anthropology	21,231	20,538	3.4
25	Political Science	20,401	21,177	3.7	25 Music	18,635	19,038	2.2	25 Geography	23,014	22,295	3.2
26	Psychology	22,577	23,426	3.7	26 Agric. Engr.	25,352	25,874	2.1	26 History	20,931	20,318	3.0
27	Mathematics	21,424	22,224	3.7	27 Food Sci. & H. H.	23,117	23,568	2.0	27 Psychiatry	35,816	34,816	2.9
28	Urb. & Metro Stu.	18,437	19,099	3.5	28 Parks & Recr.	21,530	21,944	1.9	28 Physics	26,271	25,573	2.7
29	Criminal Justice	18,662	19,308	3.4	29 History	20,848	21,241	1.9	29 German & Russian	18,629	18,159	2.6
30	Mechanical Engr.	22,016	22,713	3.2	30 Electrical Engr.	21,480	21,872	1.8	30 Human Environment	21,815	21,277	2.5
31	History	20,642	21,240	2.9	31 Political Science	20,925	21,177	1.2	31 Sociology	24,206	23,678	2.2
32	Pharmacology	21,149	21,745	2.9	32 Agric. Economics	25,728	26,032	1.2	32 Civil & Sanitary Eng	23,242	22,801	1.9
33	Anthropology	18,674	18,986	1.6	33 Poultry Science	25,451	25,634	.7	33 Criminal Justice	21,839	21,469	1.7
34	Communications	19,677	19,941	1.3	34 Resource Develop.	25,121	25,292	.7	34 Social Work	22,331	21,967	1.7
35	Agric. Economics	20,726	20,825	.5	35 Art	19,607	19,739	.7	35 Political Sicence	21,262	20,938	1.5

TABLE 2 - continued

RANK ORDERING OF DEPARTMENTS BY SALARY RESIDUALS

	MODEL I				MODEL II (AAU Market value adjustments)				MODEL III (NASULGC Market value adjustments)			
	DEPARTMENT	Dept Avg Predicted Salary	Dept Avg Actual Salary	Σ residual / Σ pred sal x 100%	DEPARTMENT	Dept Avg Predicted Salary	Dept Avg Salary Adjusted for Market Value	Σ residual / Σ pred sal x 100%	DEPARTMENT	Dept. Avg Predicted Salary	Dept Avg Salary Adjusted for Market Value	Σ residual / Σ pred sal x 100%
36	Forestry	21,113	21,182	.3	Sociology	23,849	23,900	.2	Pharmacology	30,759	30,187	1.3
37	Aud. & Speech Sci.	17,660	17,662	0.0	Criminal Justice	19,851	19,890	.2	Journalism	20,286	20,035	1.3
38	Anatomy	20,343	20,331	0.0	Urb. Plan & L. A.	22,364	22,391	.1	Religious Studies	20,888	20,634	1.2
39	Nursing	15,841	15,782	-.4	Theatre	15,998	15,972	-.2	Electrical Engr.	23,394	23,146	1.1
40	English	20,635	20,448	-.9	Accounting	22,495	22,407	-.4	Chemical Engr.	22,751	22,519	1.0
41	Journalism	19,321	19,092	-1.1	Geology	19,843	19,748	-.5	Family Ecology	21,20[illegible]	20,987	1.0
42	Physiology	21,264	20,981	-1.3	Mathematics	22,545	22,403	-.6	Dairy Science	25,703	25,474	0.9
43	Family Ecology	17,869	17,599	-1.5	Computer Science	23,563	23,396	-.7	Psychology	24,729	24,539	0.8
44	Hum. Env. & Des.	18,385	18,096	-1.5	Mechanical Engr.	24,131	23,954	-.7	Computer Science	24, 00	24,322	0.7
45	Biochemistry	22,133	21,720	-1.9	Management	23,981	23,804	-.7	Food Science	24,927	24,782	0.6
46	Food Sci. & H.N.	19,391	19,014	-2.0	German & Russian	17,297	17,156	-.8	M.H.M.	24,288	24,261	0.1
47	Geology	20,208	19,747	-2.2	M.H.M.	24,386	24,131	-1.0	Biochemistry	28,866	28,908	-0.1
48	H.P.E.R.	21,154	20,664	-2.2	Statistics	22,578	22,290	-1.3	Mathematics	23,413	23,515	-0.4
49	Entomology	19,434	18,953	-2.4	Family Ecology	20,547	20,272	-1.4	Fisheries & Wildlife	25,093	25,217	-0.5
50	Agric. Engr.	21,244	20,698	-2.6	Psychology	24,049	23,724	-1.4	Mechanical Engr.	25,359	25,658	-1.2
51	Animal Husbandry	20,777	20,238	-2.6	Chemical Engr.	23,988	23,663	-1.4	Management	25,374	25,775	-1.6
52	Zoology	22,177	21,504	-3.0	Journalism	20,030	19,665	-1.8	Geology	21,121	21,501	-1.8
53	German & Russian	17,710	17,158	-3.2	Urb. & Metro Stu	24,327	23,974	-1.9	Engr Inst. Services	20,013	20,421	-2.0
54	Poultry Science	21,028	20,507	-3.5	Pharamacology	27,773	27,182	-2.1	Labor & Indust. Rel.	24,835	25,372	-2.1
55	Crop & Soil Science	22,029	21,261	-3.7	Family & Child Sci	21,071	20,554	-2.5	Zoology	23,440	24,026	-2.4
56	Horticulture	20,927	20,165	-3.7	Religious Studies	19,400	18,786	-3.2	Philosophy	21,669	22,235	-2.5
57	Religious Studies	19,555	18,795	-3.9	Fisheries & Wdlfe	24,175	23,363	-3.4	Poultry	27,658	28,490	-2.9
58	Family & Child Sci.	19,966	19,168	-4.0	Psychiatry	34,635	33,397	-3.6	Astronomy	22,092	22,774	-3.0
59	Romance Lang.	20,881	20,022	-4.1	Zoology	22,629	21,810	-3.6	Microbiology	25,960	2 ,772	-3.0
60	Dairy Science	20,083	19,180	-4.5	Physiology	27,226	26,227	-3.7	Urban & Metro Studies	25,604	26,508	-3.4
61	Resource Develop.	21,230	20,233	-4.7	Labor & Ind Rel.	25,831	24,868	-3.7	Romance & Class. Lang	20,844	21,783	-4.3
62	Art	20,644	19,605	-5.0	Biochemistry	27,996	26,706	-4.6	Statistics	23,730	24,816	-4.4
63	Philosophy	20,487	19,398	-5.3	Romance Lang.	21,001	20,022	-4.7	Natural Science	20,711	21,682	-4.5
64	Music	20,221	19,037	-5.8	Engr. Instr. Serv	19,930	18,984	-4.7	Anatomy	26,959	28,410	-5.1
65	Fish. & Wildlife	19,883	18,690	-5.9	H.P.H.	25,638	24,388	-4.9	Fam. & Child Sci.	21,773	23,680	-8.1
66	Theatre	17,085	15,971	-6.5	Philosophy	20,847	19,676	-5.6	Linguistics	19,691	21,487	-8.4
67	Humanities	20,838	19,402	-6.8	Pathology	33,633	31,107	-7.5	Physiology	28,232	30,965	-8.8
68	Natural Science	20,720	18,951	-8.6	Natural Science	20,779	18,951	-8.8	Humanities	20,833	22,944	-9.2
69	Ling., Orient. Lg.	20,351	18,491	-9.1	Ling., Orient.	20,354	18,492	-9.1	Pathology	32,903	41,502	-20.7

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